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DRAWINGS ATTACHED

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(54) IMPROVEMENTS RELATING TO ELECTRIC SCREWDRIVERS

(71) We, WOLF ELECTRIC TOOLS LIMITED, a British Company, of Pioneer Works, Hanger Lane, London, W.5, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement: —

Electric screwdrivers commonly include a slipping clutch which can be adjusted in accordance with the torque requirements of the screw being driven; in other words the larger the screw the larger the torque required to drive it. The clutch is adjusted accordingly and when the present torque is reached the clutch slips so that no greater torque can be applied. In addition a dog clutch may be included of which the two halves are separated by a spring so that pressure exerted by the operator engages this clutch and thus provides a drive to the bit. In this way it is possible to engage the bit with a screw while it is stationary and then merely by pressure on the tool to start to drive the screw.

It is sometimes necessary to fasten plasterboard and similar soft materials to wood and metal supports. Here the requirement is to stop the screw being driven right through the plasterboard, and to stop driving when the head of the screw is flush with or just under the surface of the plasterboard. The screw must also be driven at high speed so that it drills its own hole and then forms a thread in the wood or metal support. For this purpose the adjustable type clutch is not suitable due to the very low torque necessary and the difficulty in setting the screw to a depth in soft materials.

According to the present invention an electrically powered screwdriver fitted with a dog clutch as just described has a non-rotary sleeve secured to the body of the tool so as to surround the bit and thus to engage a surface into which a screw is being driven when the correct depth is reached. During operation this sleeve is clear of the surface into which the screw is being driven so that the thrust exerted on the tool overcomes the effect of the clutch spring and holds the dog clutch engaged to transmit the drive to the bit in the normal way. When the screw is fully driven, that is to say, when the screw head reaches the required depth the sleeve engages the surface into which the screw is being driven. As a result the thrust applied to the tool is resisted by engagement between the sleeve and the surface and is no longer transmitted to the bit. This enables the spring to disengage the clutch and the drive then ceases. In other words the dog clutch is controlled by the depth to which the screw has been driven and as soon as the required depth is reached the clutch is disengaged.

Preferably the axial position of the sleeve is adjustable in relation to the body of the tool so that the depth to which the screw is driven may be controlled accordingly. In some cases, however, if a standard depth of screw head is required a fixed sleeve may be used.

A construction in accordance with the invention will now be described in more detail by way of example with reference to the accompanying drawings in which:

Figure 1 is a view of the complete tool with part broken away and part in section,

Figure 2 is a view corresponding to the left-hand part of Figure 1 showing the bit of the tool engaging a screw to start driving, and,

Figure 3 is a view corresponding to Figure 2 but showing the completion of driving.

The construction of electric screwdriver shown in Figure 1 includes a casing 1, handle 2 and trigger 3. The output shaft 4 drives one half of a dog clutch, the other half 9 being urged towards the disengaged position shown in Figure 1 by a compression spring 18 acting between the end of the shaft 4 and a sliding member 10. The member 10 includes a socket

[Price 5s. 0d. (25p)]

112 for the reception of a screwdriver bit 13. In addition a slipping clutch is formed between the part 9 of the dog clutch and a part 20 mounted on the sliding member 10. The slipping clutch is held engaged by a compression spring 25 adjusted by means of a nut 27.

When screws are to be driven into relatively hard materials such as wood the slipping clutch is adjusted so as to slip at a torque corresponding to the maximum to be applied to the screw but when screws are to be driven into relatively soft material such as plasterboard the slipping clutch is adjusted to a position in which it will not slip under the maximum torque employed. Instead the control is effected by a non-rotary sleeve 40 screwed onto a tubular cover 41 which in its turn is screwed to a further cover 35, extending from the casing 1. The sleeve 40 is thus secured rigidly to the body of the tool and does not rotate with the bit 13 which it surrounds.

Figure 1 shows the tool before being brought into use and it will be seen that the dog clutch 8, 9 is disengaged and that the bit 13 projects beyond the end of the sleeve 40. Figure 2 shows the relative positions of the parts at the beginning of operation. The bit 13 is engaged with a screw 45 which is to be screwed into the surface of soft material such as plasterboard 46. Pressure on the tool compresses the spring 18 so as to engage the dog clutch 8, 9 as can be seen from Figure 2. This movement causes the sleeve 40 to move to the left in relation to the bit 13 so that the two are substantially level with one another as also shown in Figure 2. As a result of operation of the tool the screw 45 is screwed into the material 46 until the position shown in Figure 3 is reached. In this position the sleeve 40 engages the surface of the material 46 and the thrust on the tool is therefore transmitted through the sleeve 40 to the material 46. As a consequence there is no longer any force to keep the dog clutch 8, 9 engaged and the spring 18 therefore moves the bit 13 and the member 10 to the left until the dog clutch is disengaged as can be seen in Figure 3. The drive to the screw is thus interrupted and the operation is complete. In some cases it may be necessary to drive the screw 45 until it is just flush with the surface 46 or alternatively for it to be slightly below the surface 46. To allow for this the sleeve 40 is adjustable on the cover 41 and is held in any selected position by a lock nut 42.

WHAT WE CLAIM IS:—

1. An electrically powered screwdriver including, in the drive, a dog clutch which is engageable against the action of a spring by axial pressure on the bit of the screwdriver and in which a non-rotary sleeve secured to the body of the tool surrounds the bit so as to engage a surface into which a screw is being driven and thus to disengage the clutch as soon as the screw is fully driven.

2. A screwdriver according to claim 1, in which the axial position of the sleeve is adjustable in relation to the body of the tool.

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1208212 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 1

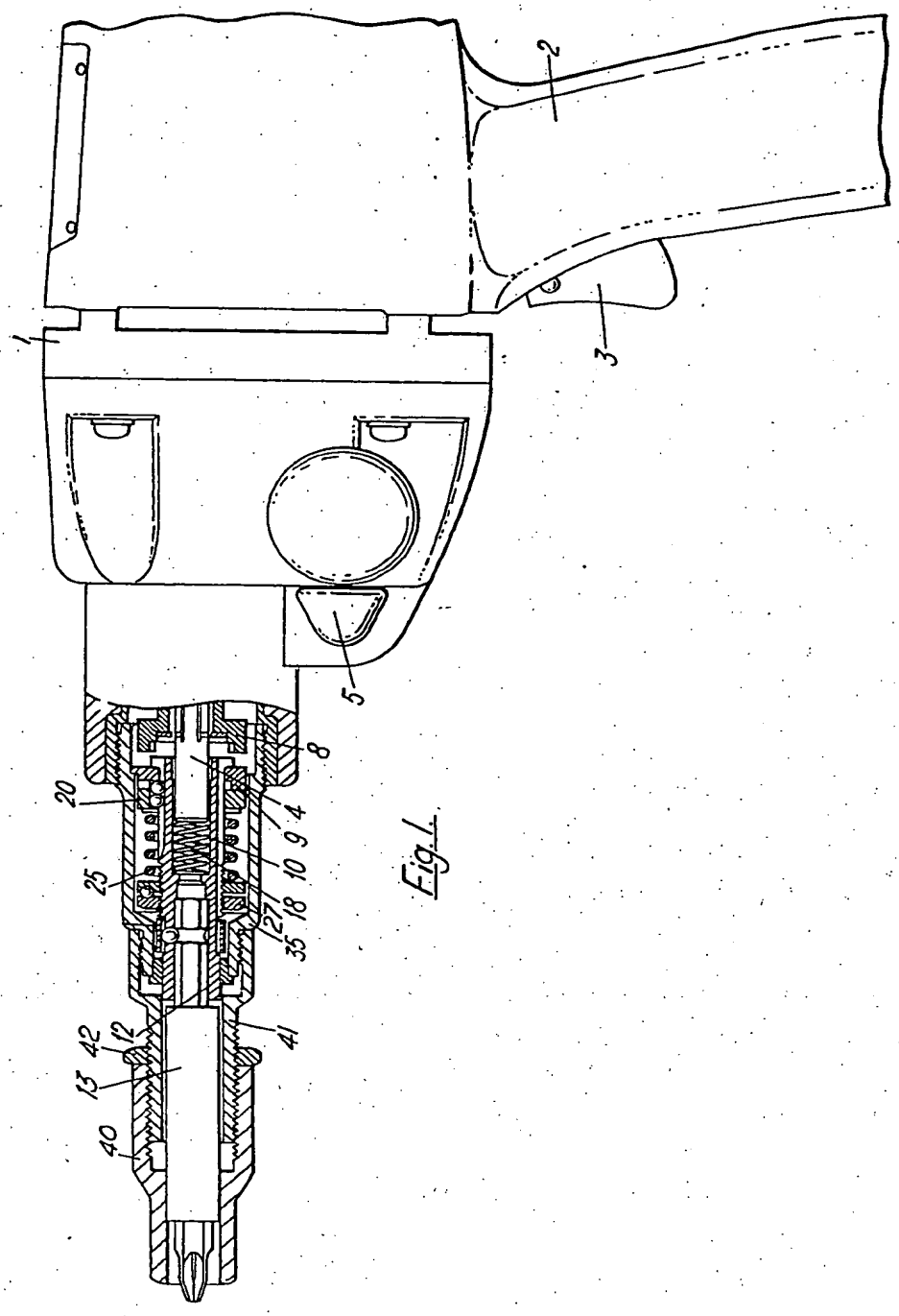


Fig.1.

Fig. 2.

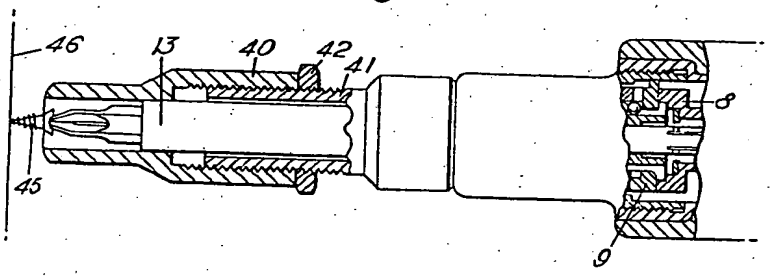
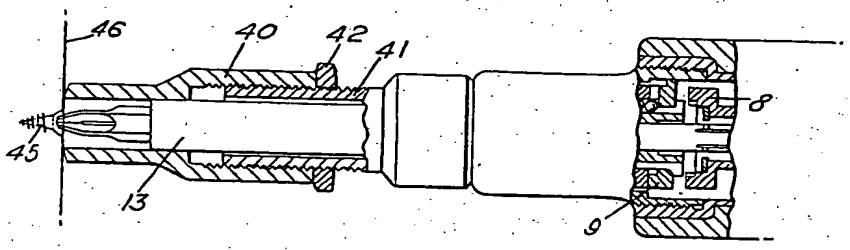


Fig. 3.



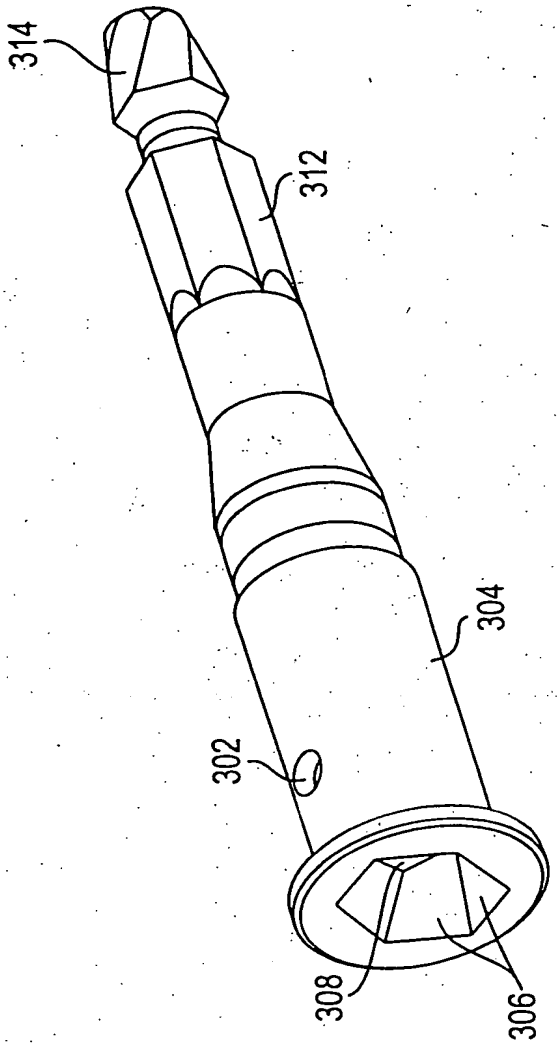


FIG. 20

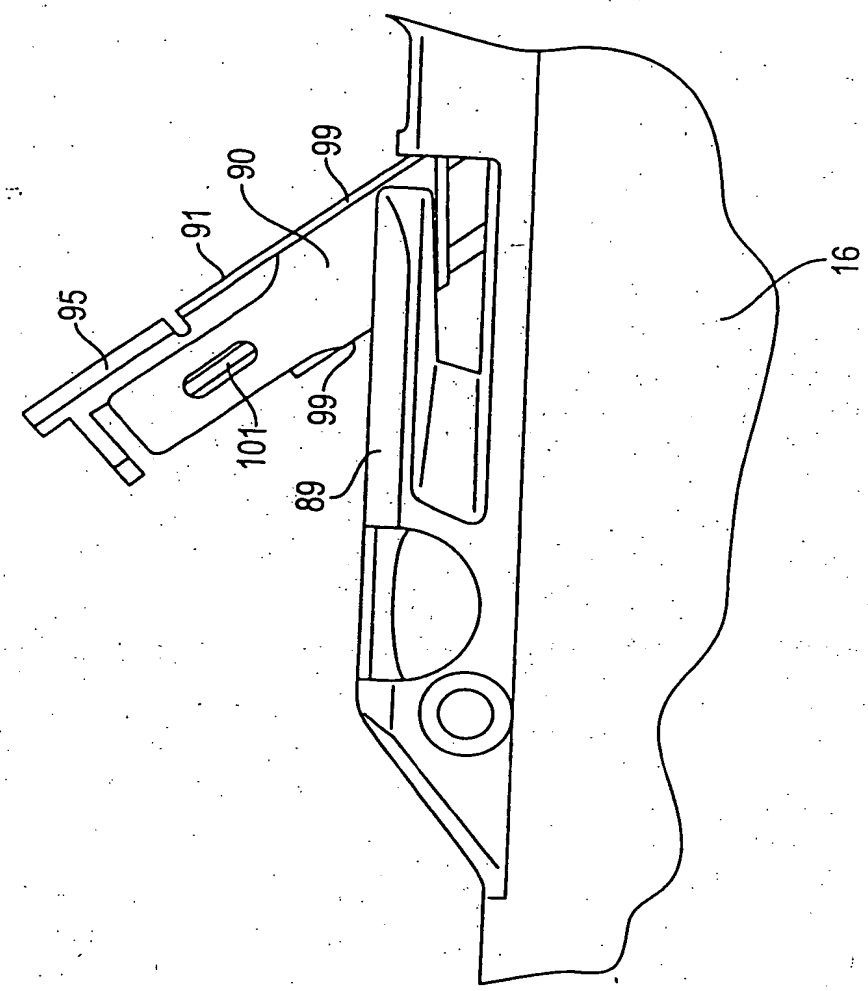


FIG. 19